AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Original) A method for forming a contact plug in a semiconductor device, comprising the steps of:

forming a contact isolation layer on a substrate, the contact isolation layer having an opening exposing a partial portion of the substrate;

depositing a conductive layer within the opening of the contact isolation layer;

doping dopants in a manner to allow the conductive layer to have different doping distributions with respect to a thickness; and

forming a contact plug within the opening through a planarization process applied to the conductive layer.

2. (Original) The method as recited in claim 1, wherein the step of doping the dopants further includes:

a first step of doping the dopants until reaching a target deposition thickness by gradually increasing a concentration of the dopants from a first concentration to a second concentration for an interval between an initial conductive layer deposition and the target deposition thickness; and

a second step of doping the dopants in a manner that the second concentration is consistently maintained throughout for an interval from the target deposition thickness to a complete deposition thickness.

3. (Original) The method as recited in claim 2, wherein, at the first step, a flow quantity of a doping gas initially added is low and is gradually increased so that the doping concentration of the dopants increases from the first concentration to the second concentration.

4. (Original) The method as recited in claim 2, wherein, at the second step, a high flow quantity of a doping gas is added and remained the same throughout so that the doping concentration of the dopants is consistently maintained to be the second concentration.

5. (Original) The method as recited in claim 2, wherein the complete deposition thickness after depositing the conductive layer ranges from about 3000 Å to about 3500 Å, and the target deposition thickness ranges from about 500 Å to about 1000 Å.

6. (Original) The method as recited in claim 2, wherein the first concentration ranges from about 5 × 1018 dopants/cm3 to about 1 × 1020 dopants/cm3, and the second concentration ranges from about 1 × 1020 dopants/cm3 to about 3 × 1020 dopants/cm3.

7. (Original) The method as recited in claim 3, wherein the doping gas is PH3 gas.

8. (Original) The method as recited in claim 1, wherein the conductive layer is either a polysilicon layer or a polysilicon germanium layer.

9. (Newly Added) A method for forming a contact plug in a semiconductor device, comprising the steps of:

forming a contact isolation layer on a substrate, the contact isolation layer having an opening exposing a partial portion of the substrate;

depositing a conductive layer within the opening of the contact isolation layer; and

forming a contact plug within the opening through a planarization process applied to the conductive layer,

wherein the step of depositing the conductive layer includes a step of doping dopants in a manner to allow the conductive layer to have different doping distributions with respect to a thickness of the conductive layer.

10. (Newly Added) The method as recited in claim 9, wherein the step of doping the dopants further includes:

a first step of doping the dopants until reaching a target deposition thickness by gradually increasing a concentration of the dopants from a first concentration to a second concentration for an interval between an initial conductive layer deposition and the target deposition thickness; and

a second step of doping the dopants in a manner that the second concentration is consistently maintained throughout for an interval from the target deposition thickness to a complete deposition thickness.

11. (Newly Added) The method as recited in claim 10, wherein, at the first step, a flow quantity of a doping gas initially added is low and is gradually increased so that the doping concentration of the dopants increases from the first concentration to the second concentration.

12. (Newly Added) The method as recited in claim 10, wherein, at the second step, a high flow quantity of a doping gas is added and remained the same throughout so that the doping concentration of the dopants is consistently maintained to be the second concentration.

13. (Newly Added) The method as recited in claim 10, wherein the complete deposition thickness after depositing the conductive layer ranges from about 3000 Å to about 3500 Å, and the target deposition thickness ranges from about 500 Å to about 1000 Å.

14. (Newly Added) The method as recited in claim 10, wherein the first concentration ranges from about 5 × 1018 dopants/cm3 to about 1 × 1020 dopants/cm3, and the second concentration ranges from about 1 × 1020 dopants/cm3 to about 3 × 1020 dopants/cm3.

15. (Newly Added) The method as recited in claim 11, wherein the doping gas is PH3 gas.

16. (Newly Added) The method as recited in claim 9, wherein the conductive layer is either a polysilicon layer or a polysilicon germanium layer.